
XXI. *Additional Observations, on some remarkable Strata of Flint in the Isle of Wight, in a Letter from Sir Henry Charles Englefield, Bart. F.R.S. to John Latbam, M.D. F.R.S. and L.S. of Romsey.*

Read July 7, 1801.

DEAR SIR,

I FEEL much flattered by the notice taken of my Paper* on the Chalk Pits of the Isle of Wight by the Linnean Society; and as I wish to render my account of the very curious appearances observed by me in them as perfect as I can, the following additional observations on the subject, made during a second visit last year, are, by your favour, submitted to the Society.

The pits I last year inspected are as follow, beginning from the east.

Brading pit, which is at the eastern point of the great ridge, where the valley of Brading Haven intersects it, and separates it from the Yaverland hill, which terminates in the sea at Culver and Bembridge.

A road cut into the chalk above Knighton.

Afhey-down pit, about three miles east of Newport.

A pit very near to, and south of, Carisbrook castle.

The cliffs and caves of Freshwater bay, both east and west of the valley, which intersects them entirely, and runs from Freshwater to Yarmouth.

The Yaverland chalk is, therefore, the only part which I have

* P. 103.

not examined, and little doubt can be entertained of its similarity to the rest of the range, to which it evidently belongs.

In Brading pit some flints appear in detached nodules, and these are found and unbroken.

The inclined strata of flint are visible, but not to advantage, owing to the manner of working the pit. In these strata the flints are universally shattered, some into absolute powder, others into grosser powder and fragments mixed. But besides these strata, the chalk in this pit is divided by vast perpendicular fissures, as smooth as plaster walls, and in some of these fissures flint has formed, which appears broken like that in the strata.

The road above Knighton only just cuts into the chalk stratum, but all the flints visible in the banks are extremely shattered.

The pit at the west end of Afhey-down, near two large barrows, is the most extensive and satisfactory of any I have seen. The perpendicular face of the chalk, where worked, is not less than fifty or sixty feet, and its direction is at right angles to that of the strata, and parallel to their line of dip:—of course, they are seen to very great advantage. The strata seem to dip northward more rapidly than in any other place where I could observe them. The angle of inclination is from 75 to 80 degrees. There are not layers of flint between every layer of the chalk. Some of the chalk is peculiarly solid, and rises in very large masses, affecting a cubic form. Their solid vein is from twenty-five to thirty feet thick, and is in strata from three to four feet. In all this solid part there are very few flints.

Both above and below this harder bed (speaking of the original position of the strata) the chalk is softer, and has more flints in it. The stratified flints in this pit are full as much shattered as any I

had seen. The nodules are not at all broken. Many of the stratified flints are much defaced in this pit by an admixture of pyrites, so as to be quite opaque, like a coarse jasper; and these flints are much softer than the others, as is always the case in the impure flint.

In the chalkpit near Carisbrook the strata are not so visible as in the pit north of the castle, (described in the first paper,) but the flints are to the full as finely, though perhaps not so generally, broken. In one flint I observed, that though it lay in its bed undisturbed, chalk, as if in a fluid state, had run into one of the fissures. Every appearance in this pit indicates that the chalk, since its stratification; has received a most violent shock.

The chalk at Freshwater bay appears in high perpendicular cliffs, particularly on the western side of the bay. Both on the east and west the strata dip northward near 80 degrees, and the dip seems to run east and west very regularly. The western cliff has a very regular and perpendicular face to the eastward; and here the parallel direction of the strata, each separated by a thin line of black flint, presents a most curious appearance. The flint here is often found in thin plates of considerable extent, sometimes not above an inch thick, and seems formed from each side of the space which it fills; as the exterior parts (or those nearest the chalk) are the purest and blackest, and it is gradually whiter towards the middle, where there is often a line of soft chalk included between the two plates of flint. All the stratified flints are more or less shattered, and some are reduced to very fine powder. The cave at Freshwater, which is really a beautiful as well as a curious one, is formed by the action of the sea on these nearly vertical strata. They are of different hardness, and all intersected with fissures at right angles to the strata. When the sea acts on and wears away a soft stratum, a gallery is formed, and

the upper parts of the stratum between fissure and fissure drop out, much in the same way as bricks are apt to do out of the flat arch over a window; the harder contiguous strata serve as walls to the gallery, but are by degrees perforated in different parts, and become irregular pillars, supporting the vast weight of the hill above, until the action of the sea weakens them so far, that they fall, and a part of the face of the hill goes with them: so that the cave is constantly, although slowly, changing its form.

Large masses of the harder strata, defended by their flint coating, also stand up in the bay as insulated rocks of different shapes, and much resembling the Needle rocks, which are exactly of the same materials, and formed by the same process. In this part of the chalk stratum I saw several fossil remains, which I had sought in vain in the pits I had visited. One was singular. It had the appearance of part of a very large shell, regularly striated, and almost flat. I have often seen small fragments apparently of a similar shell, in chalk, but never a large piece. It was so firmly fixed as not to be removed without a chisel; which I had not.

To these observations on the chalk of the island I must add, that this whole range, although really chalk, is much harder than the chalk of the South downs; insomuch that the carpenters cannot use it for drawing lines, but import chalk for that purpose from Portsdown hill, above Portsmouth. They also call the island chalk by the name of marle, which is, however, only the Breton name for chalk, and appears in many compound names, such as *Marl-borough* on the Wiltshire chalk hills, and the very significant one of *Albemarle*, or white chalk.

As I made some further observations on the southern range of hills which form the back of the island, I will trespass on your patience a little longer, particularly as they in some degree contradict,

or

or rather correct, what I had advanced on that subject in my former letter.

When the northern front of those hills is viewed from Ashley down, the stratum of stone mentioned in my former letter, as lying directly under the chalk of St. Catharine's and Dunnoke hills, appears every where to maintain an horizontal position; and so in its general disposition, particularly in its northern front, it certainly does; but just behind the village of Ventnor, the stratum entirely disappears, as if it had been ingulphed in a great chasm; and a deep and narrow valley runs winding into the chalk hill of St. Boniface, though it does not penetrate through it, which seems the remains of the fissure into which the stone had sunk.

The appearances of the great stone stratum, from Niton eastward to Ventnor, are noted as follows in the journal made on the spot:

On an attentive inspection of the strata of the under cliff, it appears that the great stratum of rugged and laminated stone, which first appears at the west side of St. Catharine's, and, thence ranging eastward, forms the front of the cliffs overhanging the Underway, dips in its southern face gently to the eastward. The cliffs at Mirables are much higher above the sea than those of St. Laurence; and from thence they decline till at the opening in the hill above Ventnor they totally disappear. A small crag just peeps out of the eastern face of this dell, and the whole hill of St. Boniface is, as far as can be seen, composed of chalk. As, however, this, like all other chalk hills, is in the state of a steep slope covered with turf, perhaps by digging into its face the stony stratum might be discovered. It is also to be observed, that the chalk, which is not visible above the rock at Mirables, begins to appear soon after, and grows gradually thicker as it proceeds eastward. At St. Laurence, it forms a thick cap to the rocks; and at Steephill shute its thick-

ness is very much increased, and soon after nothing but chalk appears in St. Boniface's hill. In what form the rock re-appears at Dunnose to the east of St. Boniface, I have had no opportunity of examining.

I should not, dear Sir, trouble you with these defective observations, but that every notice, however imperfect, may be of use when connected by future observations, and that they may serve as a stimulus to other travellers who often go over this beautiful line of country, to turn their attention to its singular natural phenomena.

I send you two specimens of the broken flints; one from above Brading, the other from near Carisbrook; but the tickets are mislaid, and I am not sure which is which.

I remain, &c.

Filney Street,
May 26, 1801.